

A Study of Blossom-drop of Tomatoes and Control Measures

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(Presented at the meeting of October 1, 1936.)

For several years, as I have indicated in a former paper (see P.H.E.S., VII, 247) an immigrant bug* has been giving trouble to growers of tomatoes in Hawaii. During September, 1936, I had an opportunity to make further observations on this pest, and to experiment with methods of control.

In my garden at Kaimuki I had a very large plant of the small pear-shaped tomato. The runners had been trained up onto an iron frame so that they reached a height of about eight feet. This plant bore prolifically, but suddenly ceased, though the foliage was luxuriant. I found that the tips of the branches were infested with great numbers of these mirid bugs, and that practically all the blossoms dropped before they opened. The newer growth showed sunken, purplish rings, both around the stems and around some of the leaf stalks. The stems have a tendency to break easily at these injured places. The rings are evidently caused by the feeding of the bugs. Sections through the rings show only dead, corky cells, with no suggestion of egg-punctures. On older stems there is some swelling on either side of the ring; evidence that the plant is covering the injury. Since the tips of the branches, especially around the unopened flower buds, were swarming with nymphs in all stages, I concluded that the eggs must be inserted in this portion of the plant, though I was not able to locate them. However, when I placed the unopened flower buds in a glass tube, many nymphs hatched from them. Furthermore, the few flowers that did open, developed abnormal fruits, with rings of scars. These appeared to be egg-punctures. In one of these rings, extending entirely around the fruit, I counted more than 30 punctures, which when opened showed only corky tissue. In one instance a nymph was discovered, when a tiny fruit with a ring of punctures was sectioned.

The nymphs pass through five stages in about nine or ten days. The first stage nymphs are yellowish with very conspicu-

* *Cyrtopeltis varians* (Dist.), formerly determined as *Engytatus geniculatus* Reuter. Proc. Haw. Ent. Soc., IX, No. 3, September, 1937.

ous red eyes. Second stage, lighter color, more greenish and active, eyes brown. Third stage, greener body, yellowish head, nodes and distal segment antennae blackish. Fourth stage, more green, wing pads beginning to show, eyes blackish. Fifth stage, very green, eyes darker, wing buds reaching one-third the length of the abdomen.

The adult bugs are very active, especially during the warm, sunny part of the day. They can be seen flying over the plant, and even to some distance.

Control Measures.—As I have suggested previously, a pest of this kind should not be difficult to control. Any good contact spray ought to do the work. I tried "Penetrol" and Pyrethrum extract with success, spraying the plant at weekly intervals. Later, I tried out a spray of straight Deo-Base oil, with Pyrethrum added in the same strength as used in household sprays, i.e., one quart Pyrethrum 20 to five gallons of the oil. This gave splendid results in killing the bugs, and when applied in a very fine fog did not damage the foliage.

Observations on the Predaceous Habits of *Cyrtopeltis varians* (Dist.)¹ (Hemip.)

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While making a study of this tomato blossom blighter, I saw the bugs with their beaks inserted in plant lice. Following up this observation, I found that they eagerly sought out other forms of insect diet. As early as October 16, 1929, Rosewall and Smith,² of the Louisiana Experiment Station, discovered this habit.

Dr. Rosewall and Mr. Smith were making observations on corn earworms, *Heliothis* spp., when they discovered both adults and nymphs of these bugs with their beaks inserted in the eggs of the moths. They, also, found them feeding on the young larvae.

¹ Mr. Robert L. Usinger called my attention to a change of name; the species heretofore determined as *Engytatus geniculatus* Reuter, (Rev. Ap. Ent. Ser. A.22, 421).

² Rosewall, O. W., and Smith, C. E.—The predaceous habit of *Cyrtopeltis varians* (Dist.) Jour. Econ. Ent. XXIII, p. 464, Sc. notes. 1930.

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